

Listing of Claims

Claim 1 (Previously Presented): A method of identifying a plurality of key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, said method comprising:

determining a rate of change of visual content of each current frame from a corresponding reference frame, each of said current frame and said reference frame being comprised in said sequence of image frames,

wherein said rate of change represents a difference of a first value and a second value, said first value representing a change of visual content of a current frame compared to a first frame, said second value representing a change of visual content of said first frame compared to a second frame, wherein said second frame is a reference frame for said first frame and said first frame is a reference frame for said current frame; and

selecting said current frame as a corresponding one of a set of potential video frames if said rate exceeds a corresponding first threshold value, wherein said plurality of key video frames are selected from said set of potential video frames,

wherein said determining and said selecting are repeated for each of said sequence of image frames as said current frame to form said set of potential video frames,

wherein each of the respective first frame and the respective second frame are different for different ones of the current frame in said sequence of image frames.

Claim 2 (Previously Presented): The method of claim 1, wherein said determining comprises:

determining a displacement magnitude of each moved pixel of said current frame compared to the position in said first frame and of said first frame compared to the position in said second frame; and

computing a first representative magnitude of said displacement magnitude for said moved pixels of said current frame compared to said first frame, and a second representative magnitude of said displacement magnitude for said moved pixels of said first frame compared to said second frame,

wherein said first value and said second value respectively equal said first representative magnitude and said second representative magnitude such that said rate is computed as a difference of said first representative magnitude and said second representative magnitude

Claim 3 (Previously Presented): The method of claim 2, wherein said first representative magnitude for said current frame equals an average of motion energy vector magnitudes of said moved pixels of said current frame in comparison with corresponding pixels of said first frame.

Claim 4 (Previously Presented): The method of claim 3, wherein said first threshold value is the same for all of said current frames, said selecting further comprises:

including said current frame in said set of potential video frames only if said first representative magnitude exceeds a second threshold; and

including only those of said set of potential video frames, which exceed said first threshold, in said plurality of key video frames.

Claim 5 (Original): The method of claim 4, wherein said first threshold and said second threshold are adjusted dynamically to ensure that a desired number of frames are selected as key video frames in a specified duration.

Claim 6 (Original): The method of claim 4, further comprising identifying a plurality of active pixels in said current frame, wherein a pixel is considered an active pixel if a corresponding displacement magnitude is outside of a range, wherein only said plurality of active pixels are used by said computing.

Claim 7 (Original): The method of claim 6, wherein said range set by a distance of two times the variance from the mean of a distribution.

Claim 8 (Previously Presented): The method of claim 6, wherein said first representative magnitude comprises an average of said active pixels.

Claim 9 (Original): The method of claim 6, further comprising:
enabling a user to specify one of a plurality of key video frames, wherein said plurality of key video frames are selected by said selecting; and
displaying said specified one of said plurality of key video frames.

Claim 10 (Original): The method of claim 9, further comprising:

displaying a prior key video frame and a next key video frame in relation to said specified one of said plurality of key video frames, wherein said prior key video frame and said next key video frame are comprised in said plurality of key video frames.

Claim 11 (Original): The method of claim 10, further comprising:

generating a display indicating the manner in which said plurality of key video frames are interspersed in said sequence of image frames, wherein said enabling is based on said display.

Claim 12 (Original): The method of claim 11, wherein said display comprises a pie chart.

Claim 13 (Original): The method of claim 10, further comprising:

generating a display listing said plurality of key video frames, wherein said enabling is based on said display.

Claim 14 (Previously Presented): The method of claim 1, wherein the corresponding first frame and the corresponding second frame are selected at a same respective relative position in comparison to the position of the current frame such that each of the respective first frame and the respective second frame are different for different current frame.

Claim 15 (Previously Presented): The method of claim 14, wherein said current frame, said first frame and said second frame are in consecutive successive positions in said sequence of frames.

Claim 16 (Previously Presented): A computer readable medium storing one or more sequences of instructions for causing a processing system to identify key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, wherein execution of said one or more sequences of instructions by one or more processors contained in said processing system causes said one or more processors to perform the actions of:

determining a rate of change of visual content of each current frame from a corresponding reference frame, each of said current frame and said reference frame being comprised in said sequence of image frames,

wherein said rate of change represents a difference of a first value and a second value, said first value representing a change of visual content of a current frame compared to a first frame, said second value representing a change of visual content of said first frame compared to a second frame, wherein said second frame is a reference frame for said first frame and said first frame is a reference frame for said current frame; and

selecting said current frame as a key video frame if said rate exceeds a first threshold value.

Claim 17 (Previously Presented): The computer readable medium of claim 16, wherein said determining comprises:

determining a displacement magnitude of each moved pixel of said current frame compared to the position in said first frame and of said first frame compared to the position in said second frame; and

computing a first representative magnitude of said displacement magnitude for said moved pixels of said current frame compared to said first frame, and a second representative magnitude of said displacement magnitude for said moved pixels of said first frame compared to said second frame,

wherein said first value and said second value respectively equal said first representative magnitude and said second representative magnitude such that said rate is computed as a difference of said first representative magnitude and said second representative magnitude..

Claim 18 (Previously Presented): The computer readable medium of claim 17, wherein said first representative magnitude for said current frame equals an average of motion energy vector magnitudes of said moved pixels of said current frame in comparison with corresponding pixels of said first frame.

Claim 19 (Previously Presented): The computer readable medium of claim 18, wherein said current frame is selected as said key video frame only if said first representative magnitude exceeds a second threshold .

Claim 20 (Original): The computer readable medium of claim 19, wherein said first threshold and said second threshold are adjusted dynamically to ensure that a desired number of frames are selected as key video frames in a specified duration.

Claim 21 (Original): The computer readable medium of claim 19, further comprising identifying a plurality of active pixels in said current frame, wherein a pixel is considered an active pixel if a corresponding displacement magnitude is outside of a range, wherein only said plurality of active pixels are used by said computing.

Claim 22 (Original): The computer readable medium of claim 21, wherein said range set by a distance of two times the variance from the mean of a distribution.

Claim 23 (Previously Presented): A digital processing system identifying key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, said digital processing system comprising:

means for determining a rate of change of visual content of each current frame from a corresponding reference frame, each of said current frame and said reference frame being comprised in said sequence of image frames,

wherein said rate of change represents a difference of a first value and a second value, said first value representing a change of visual content of a current frame compared to a first frame, said second value representing a change of visual content of said first frame compared to a second frame, wherein said second frame is a reference frame for said first frame and said first frame is a reference frame for said current frame; and

means for selecting said current frame as a key video frame if said rate exceeds a first threshold value.

Claim 24 (Previously Presented): The digital processing system of claim 23, wherein said means for determining is operable to:

determine a displacement magnitude of each moved pixel of said current frame compared to the position in said reference first frame and of said first frame compared to the position in said second frame; and

compute a first representative magnitude of said displacement magnitude for said moved pixels of said current frame compared to said first frame, and a second representative magnitude of said displacement magnitude for said moved pixels of said first frame compared to said second frame,

wherein said first value and said second value respectively equal said first representative magnitude and said second representative magnitude such that said rate is computed as a difference of said first representative magnitude and said second representative magnitude.

Claim 25 (Previously Presented): The digital processing system of claim 24, wherein said first representative magnitude for said current frame equals an average of motion energy vector magnitude of said moved pixels of said current frame in comparison with corresponding pixels of said first frame.

Claim 26 (Previously Presented): The digital processing system of claim 25, wherein said current frame is selected as said key video frame only if said first representative magnitude exceeds a second threshold .

Claim 27 (Original): The digital processing system of claim 26, wherein said first threshold and said second threshold are adjusted dynamically to ensure that a desired number of frames are selected as key video frames in a specified duration.

Claim 28 (Canceled)

Claim 29 (Previously Presented): A method of identifying a plurality of key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, said method comprising:

receiving said sequence of frames of a same scene/area of interest according to a sequential order;

choosing one of said sequence of image frames as a current frame, a first frame being before said current frame and a second frame being before said first frame according to said sequential order, said first frame being at a first relative position in relation to said first frame in said sequential order and said second frame being at a second relative position in relation to said first frame in said sequential order;

calculating a difference of a first value and a second value, said first value representing a measure of a change of visual content of said current frame compared to said first frame, and said second value representing a measure of a change of visual content of said first frame compared to a second frame;

selecting said current frame as a corresponding one of said plurality of key video frames if said difference exceeds a first threshold value and first value exceeds a second threshold value; and

repeating said calculating and said selecting after choosing each of said sequence of image frames as said current frame to form said plurality of key video frames,

wherein each of the respective first frame and the respective second frame are different for different ones of the current frames, and are respectively determined based on the same first relative position and said second relative position in reference to the corresponding current frame.